



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/920,285	08/01/2001	Hans-Jurgen Mann	637.0008USQ	5678

7590 09/08/2003

Charles N.J. Ruggiero, Esq.
Ohlandt, Greeley, Ruggiero & Perle, L.L.P.
10th Floor
One Landmark Square
Stamford, CT 06901-2682

EXAMINER

NGUYEN, THONG Q

ART UNIT	PAPER NUMBER
----------	--------------

2872

DATE MAILED: 09/08/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/920,285	Applicant(s) MANN ET AL.	
	Examiner Thong Q. Nguyen	Art Unit 2872	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 August 2001 and 14 November 2001.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,5-10 and 12-27 is/are rejected.
- 7) ☒ Claim(s) 3,4 and 11 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input checked="" type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>4 & 8</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. The present Office action is made in response to the Pre-amendments filed on 8/1/2001 and 11/14/2001. It is noted that in the pre-amendment of 8/1/2001, applicant has amended all original claims 1-24 and added a new set of claims, i.e., claims 25-27, into the application. The pending claims 1-27 are examined in this Office action.

Priority

2. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Priority

3. In the Pre-amendment of 11/14/2001, applicant has requested to amend the specification by adding a statement that the present application is a Continuation-in-part of the application serial number 09/503,640 filed on 2/14/2000. It is noted that applicant has also filed a request for corrected filing receipt on 1/16/2002. The request for correcting the filing receipt and the request to amend the present application as a Continuation-in-part of the application serial number 09/503,640 are denied by the Office as set forth in the communication mailed to applicant on 2/8/2002.

Since applicant has not provided any response to the communication of 2/8/2002, applicant is required to cancel the material to the specification as listed in the pre-amendment of 11/14/2001.

Drawings

4. The drawings contain sixteen sheets of figures 1-14 were received on 8/1/2001. These drawings are objected by the Office drafts person for the reasons as set forth in the attached form PTO-948.

Specification

5. The lengthy specification which is amended by the Pre-amendments has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

6. The disclosure is objected to because of the following informalities: a) In page 5: line 9, "300 nm" should be changed to --300 mm--; b) In page 7: lines 10-13, the description thereof "the third to the second mirror (S2S3) relative to the distance from the fourth to the third mirror (S4S3)" should be changed to -- the third to the fourth (S3S4) relative to the distance from the second to the third mirror (S2S3)--. The reason of that suggestion is for the purpose of maintains the consistence of the language used in the application. See the manner in which applicant states the relation between the distance (S4S1) and (S2S1) as shown in the same page, lines 4-7. Appropriate correction is required.

7. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required: The specification fails to provide an antecedent basis for the feature thereof "wherein the second to... -concave" recited in claim 21.

Art Unit: 2872

Sugg stions

8. The following corrections as suggested to claims 6, 10, 11 and 27.

a) In each of claims 6 and 11, the feature "the image plane" (claim 6, lines 1-2 and claim 11, line 4) should be changed to --an image plane--so that the claim(s) complies with the requirement of 35 USC 112, second paragraph.

b) In claim 10, lines 2-3, the feature thereof "the third to the second mirror (S2S3) relative to the distance from the fourth to the third mirror (S4S3)" should be changed to -- the third to the fourth (S3S4) relative to the distance from the second to the third mirror (S2S3)--. The reason of that suggestion is for the purpose of maintains the consistence of the language used in the application. See the manner in which applicant states the relation between the distance (S4S1) and (S2S1) as claimed in claim 9.

c) The suggestion as set forth in element b) above is also raised to claim 27.

Double Patenting

9. A rejection based on double patenting of the "same invention" type finds its support in the language of 35 U.S.C. 101 which states that "whoever invents or discovers any new and useful process ... may obtain a patent therefor ..." (Emphasis added). Thus, the term "same invention," in this context, means an invention drawn to identical subject matter. See *Miller v. Eagle Mfg. Co.*, 151 U.S. 186 (1894); *In re Ockert*, 245 F.2d 467, 114 USPQ 330 (CCPA 1957); and *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970).

A statutory type (35 U.S.C. 101) double patenting rejection can be overcome by canceling or amending the conflicting claims so they are no longer coextensive in scope. The filing of a terminal disclaimer cannot overcome a double patenting rejection based upon 35 U.S.C. 101.

Art Unit: 2872

10. Claim 25 is objected to under 37 CFR 1.75 as being a substantial duplicate of claim 4/3/1. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

11. Claim 26 is objected to under 37 CFR 1.75 as being a substantial duplicate of claim 9/1. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

12. Claim 27 is objected to under 37 CFR 1.75 as being a substantial duplicate of claim 10/1. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

Claim Rejections - 35 USC § 102

13. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

Art Unit: 2872

14. Claims 1, 6-7, 9-10, 14, 17-20, 22-24 and 26-27 are rejected under 35 U.S.C. 102(a) as being anticipated by Takahashi (Japanese reference No. 2000-100694).

Takahashi discloses an exposure projection system having a catadioptric system for lithographically manufacturing devices like semiconductor devices. The system as described in the embodiment 1, pages 2-10 and figure 1, comprises the following optical features: 1) the wavelengths is 13.4 nm; 2) there are six mirrors M1-M6 whose shapes are concave, concave, concave, planar, convex and concave configuration wherein each mirror comprises an off-axis segment for reflecting light incident thereon and arranged in a manner which does not block light to other mirrors; 3) the imageside numerical aperture is 0.14; 4) the object height is about 120 mm; 5) the exposure region is an annular shape having a radius of 30 mm and width of 1 mm; 6) the effective diameters of the mirrors M1-M6 is 344 mm; 7) an aperture stop located between the first and second mirrors; 8) the fourth mirror M4 is located between the second mirror M2 and the image plane (W); 9) the fourth mirror M4 is located between the second and third mirrors; 10) the ratio defined by the distance between the fourth and first mirror and the distance between the second and first mirror is a value in the range of (0.1;0.9) and the ratio defined by the third and fourth mirrors and the distance between the second and third mirror is a value in the range of (0.3;0.9); 11) the system is telecentric on the image side; 12) the mirrors M1-M3 and M5-M6 are aspheric mirrors

Art Unit: 2872

and the mirror M4 is nonspherical mirror. Regard to the feature "objective" recited in the preamble of the claim 1, such a feature is not given a patentable weight because all of features recited after the term "comprising" do not provide specific limitations for the term "objective" referred to in the preamble part of the claim.

Claim Rejections - 35 USC § 103

15. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

16. Claims 1-2, 5-10, 13-16, 18-24, and 26-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shafer (U.S. Patent No. 5,686,728, submitted by applicant) in view of Takahashi (Japanese reference No. 2000-100694)

Shafer discloses a projection lithography system in the production of semiconductor chips. The system as described in columns 7-9 and shown in figure 2 comprises the following optical features: 1) the wavelengths used in the range of ultraviolet spectrum; 2) there are six mirrors M1-M6 whose shapes are convex, concave, convex, concave, convex and concave configuration wherein each mirror comprises an off-axis segment for reflecting light incident thereon and arranged in a manner which does not block light to other mirrors; 3) the numerical aperture is 0.45; 4) the exposure region is an annular shape having a radius of 26 mm and width

of 1 mm; 5) an aperture stop located between the first and second mirrors; 6) the fourth mirror M4 is located between the second mirror M2 and the image plane (W); 7) the fourth mirror M4 is located between the second and third mirrors; 8) the fourth mirror is located between the first and second mirrors; 9) the ratio defined by the distance between the fourth and first mirror and the distance between the second and first mirror is a value in the range of (0.1;0.9) and the ratio defined by the third and fourth mirrors and the distance between the second and third mirror is a value in the range of (0.3;0.9); 10) an intermediate image is formed after the fourth mirror; 11) the first mirror has a zero base configuration and all of the mirrors have aspheric configuration; 12) the system is telecentric on the image side, and 13) the edge region encircling the off-axis segments of the mirrors is larger than 4 mm. Regard to the feature "objective" recited in the preamble of the claim 1, such a feature is not given a patentable weight because all of features recited after the term "comprising" do not provide specific limitations for the term "objective" referred to in the preamble part of the claim. As a result, the system provided by Shafer meets all of the limitations recited except the feature relating to the relationship between the diameter of the mirrors and the numerical aperture. However, the use of an exposure system having six mirrors wherein the diameter of the mirrors and the numerical aperture of the system is small is disclosed in the art as can be seen in the system provided by Takahashi. In particular,

Takahashi discloses an exposure projection system having a catadioptric system for lithographically manufacturing devices like semiconductor devices. The system as described in the embodiment 1, pages 2-10 and figure 1, comprises six mirrors M1-M6 wherein the effective diameters of the mirrors M1-M6 is 344 mm. Takahashi also discloses that the mirrors M1-M3 and M5-M6 are aspheric mirrors and the mirror M4 is nonspherical mirror. Thus, it would have been obvious to one skilled in the art at the time the invention was made to modify the system provided by Shafer by using mirror whose effective diameter is small as suggested by Takahashi for the purpose of reducing the obscuration to the transmission of light in the system.

Regarding to the feature that the diameter of the mirror is smaller than 300 mm as recited in claim 2, such a feature would have been obvious to one skilled in the art. The support for that conclusion is found in the teaching provided by Takahashi when he discloses that the effective diameter of the mirror has a maximum of 344 mm. Thus, it would have been obvious to one skilled in the art to adjust the effective diameter of the mirror in the combined product for the purpose of satisfying a particular design.

17. Claims 1, 12-14, and 17-24 rejected under 35 U.S.C. 103(a) as being unpatentable over Hudyma (U.S. Patent No. 6,033,079, submitted by applicant) in view of Takahashi (Japanese reference No. 2000-100694)

Hudyma discloses a projection lithography system in the production of semiconductor chips. The system as described in columns 6-9 and shown

in figure 5 comprises the following optical features: 1) the wavelengths used in the range of ultraviolet spectrum; 2) there are six mirrors M1-M6 whose shapes are concave, concave, convex, concave, convex and concave configuration wherein each mirror comprises an off-axis segment for reflecting light incident thereon and arranged in a manner which does not block light to other mirrors; 3) the numerical aperture is larger than 0.25; 4) the exposure region is an annular shape having a radius of 30 mm and width of 2 mm; 5) an aperture stop located between the first and second mirrors; 6) an intermediate image is formed after the fourth mirror; 7) the system is telecentric on the image side, and 8) the angle of incidence of a chief ray on each mirror is in the range of 12-15 degrees.

Regard to the feature "objective" recited in the preamble of the claim 1, such a feature is not given a patentable weight because all of features recited after the term "comprising" do not provide specific limitations for the term "objective" referred to in the preamble part of the claim. As a result, the system provided by Hudyma meets all of the limitations recited except the feature relating to the relationship between the diameter of the mirrors and the numerical aperture. However, the use of an exposure system having six mirrors wherein the diameter of the mirrors and the numerical aperture of the system is small is disclosed in the art as can be seen in the system provided by Takahashi. In particular, Takahashi discloses an exposure projection system having a catadioptric system for lithographically manufacturing devices like semiconductor

devices. The system as described in the embodiment 1, pages 2-10 and figure 1, comprises six mirrors M1-M6 wherein the effective diameters of the mirrors M1-M6 is 344 mm. Takahashi also discloses that the mirrors M1-M3 and M5-M6 are aspheric mirrors and the mirror M4 is nonspherical mirror. Thus, it would have been obvious to one skilled in the art at the time the invention was made to modify the system provided by Hudyma by using mirror whose effective diameter is small as suggested by Takahashi for the purpose of reducing the obscuration to the transmission of light in the system.

Allowable Subject Matter

18. Claims 3-4 and 11 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

19. The following is an examiner's statement of reasons for allowance: ***

a) Claim 3/1 is allowable with respect to the cited art by the limitations relating to the structure of the mirrors and the arrangement of the mirrors in the system. In particular, the cited art does not disclose that the thickness of each first, second, third, fourth and sixth mirrors is larger than 50 mm and the thickness of the fifth mirror is larger than 1/3 of its diameter.

b) Claim 11/1 is allowable with respect to the cited art for the limitation relating to the dimension of the ring-field radius which is calculated/related to the distance between the fifth and sixth mirrors, the radii of the fifth and sixth mirrors and the numerical aperture of the system.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

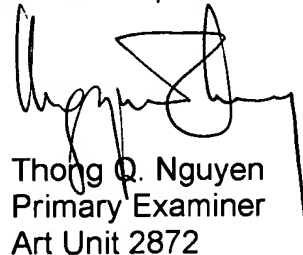
Conclusion

20. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

21. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thong Q. Nguyen whose telephone number is (703) 308-4814. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Drew A Dunn can be reached on (703) 305-0024. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703 308 0956.



Thong Q. Nguyen
Primary Examiner
Art Unit 2872
